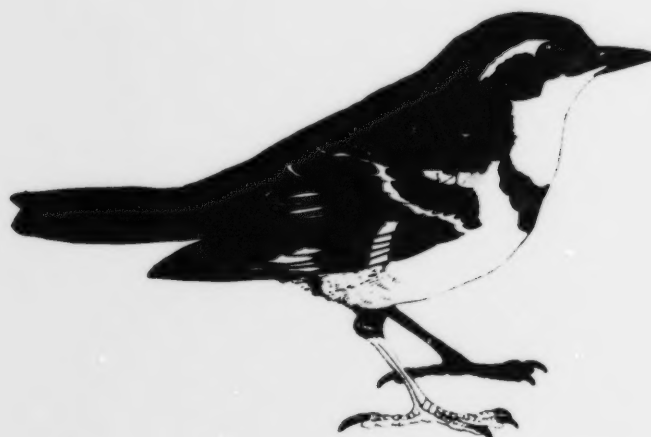


AERIAL SURVEYS OF MIGRATORY BIRDS ON THE FRASER RIVER DELTA, 1985-86

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R. McKelvey

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ABSTRACT

The results of three aerial surveys over the estuary of the Fraser River between September 1985 and March 1986 are summarized. The numbers seen were compared to those recorded during the Boundary Bay Study (McKelvey et al. 1985). The numbers of geese and dabbling ducks were within the ranges of those seen previously. The number of gulls seen was slightly above the average. Gull numbers appear to have increased regularly since 198283.

RESUME

Les resultats de trois inventoires aeriens effectues au dessus de l'estuaire du fleuve Fraser entre les mois de septembre 1985 et mars 1986 sont presentes. Les nombres observes furent compares a ceux obtenus lors des derniers inventoires (McKelvey et al. 1985). Le nombre d'oies et de canards barbatteurs observes se situait entre les extremes observees auparavant. Le nombre de goelands etait legerement plus eleve que la moyenne. Le nombre de goelands semble s'etre accrue a un rythme regulier depuis 198283.

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INTRODUCTION

The delta and estuary of the Fraser River, British Columbia (Fig. 1) is one of the most important wintering habitats for migratory birds in Canada (Taylor 1970; Cooperative Waterfowl Management Plan for British Columbia [CWMPBC] 1983). It is also the most densely populated part of the province, which has resulted in the loss of considerable amounts of wetland habitat. Because of these two factors, efforts have been made over the years to monitor trends in abundance of certain groups of birds wintering on the estuary, most conspicuously waterfowl.

In the winter of 1982-83 an intensive 2 year study of the distribution and abundance of birds wintering on the Fraser estuary began. That study was sponsored by Transport Canada and was conducted by the Canadian Wildlife Service. The purpose of the study was to gather information to fulfill a requirement set by the Environmental Assessment Review Panel, concerning the reactivation of the Boundary Bay Airport. For that study a review of previous aerial surveys of waterfowl wintering on the delta was presented and compared with the results of the new study (McKelvey *et al.* 1985).

In the present report the results of surveys over the same routes as those used in the study by McKelvey *et al.* (1985) are presented for 1985-86. The numbers of birds seen are compared with those seen during the "Boundary Bay Study" (McKelvey *et al.* 1985) and to those of previous studies, as reported in McKelvey *et al.* (1985). The intention is to present similar reports on a regular basis, so that a population monitoring is effected.

METHODS

In the winter of 1985-86 three aerial surveys were flown over the Fraser estuary, following the same route used in the Boundary Bay study (McKelvey *et al.* 1985). The surveys were conducted on 9 September and 30 October 1985 and

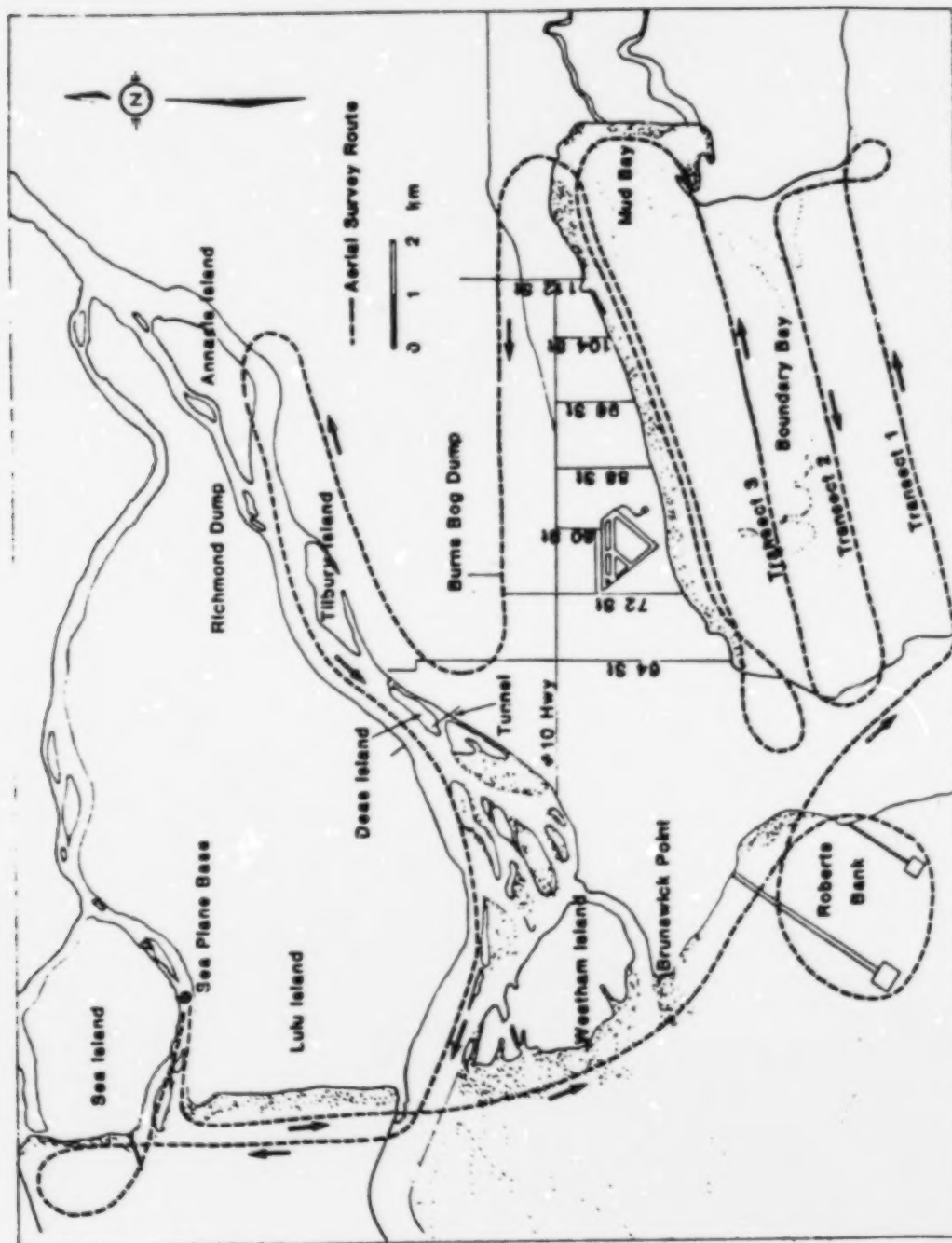


Figure 1. Study area and the location of aerial survey routes, 1985-86 surveys.

9 January 1986. The procedure was identical to that used by McKelvey *et al.* (1985:7). No statistical analysis of the results was possible however, because the surveys were not as frequent as those conducted during the Boundary Bay study. Therefore, the data are presented as the numbers of birds seen, with no measures of variability.

RESULTS AND DISCUSSION

The weather in 1985-86 was somewhat different from the norm. Very low temperatures were reached in November and December and precipitation was much below normal. The latter part of the winter was exceptionally mild, with above average precipitation and temperatures in January (Table 1).

The distribution and abundance of geese, dabbling ducks and gulls is shown in Tables 1 to 3, for all areas except the open waters of Boundary Bay. These results are compared with data from the Boundary Bay study in Figs. 2 to 9.

On the foreshore area snow goose numbers were slightly higher than in the past, on the same dates. That may have been due to the apparently high breeding success the population enjoyed in 1985. The percentage of juvenile birds was estimated to be about 40% in some flocks (pers. obs.; pers. com. M. Davisson). The numbers seen in early January were within the range of previous surveys. After the re-opening of goose hunting in late January, few snow geese were seen again until late February, 1986.

The numbers of dabbling ducks and gulls seen on the foreshore were also within the range of those seen previously. Largest concentrations were recorded in all surveys between the Roberts Bank and Tsawwassen causeways. There is a mixing of dabbling and diving/sea ducks at that location, which may impair accuracy of those estimates. However, that bias would have affected

Table 1. Recent average weather conditions and averages observed in the winter of 1985-86.

Variable	Month	10 Year Average ¹	1985-86 Average ¹
Mean temp range (°C)	S	9.0 - 18.9	9.0 17.1
	O	5.3 - 13.9	6.5 12.6
	N	2.1 - 8.8	-3.2 3.4
	D	0.6 - 6.3	-0.7 3.4
	J	-1.1 - 4.9	3.1 9.0
	F	1.3 - 7.9	
	M	2.3 - 9.8	
Percip. (cm)	S	52.9	59.1
	O	82.0	201.6
	N	142.0	84.1
	D	151.0	53.6
	J	95.0	207.8
	F	99.3	
	M	79.9	
Sunshine (hrs)	S	180.3	171.9
	O	132.1	108.0
	N	69.6	103.6
	D	53.1	40.9
	J	62.1	49.0
	F	74.7	
	M	128.4	
Wind speed (km/h)	S	16.5	10.6
	O	18.0	11.2
	N	20.7	12.2
	D	22.9	13.0
	J	19.9	10.7
	F	19.6	
	M	21.4	

1 Source: Atmospheric Environment Service, Vancouver.

the data in the Boundary Bay study report as well. "Total ducks" would better describe what was seen there, rather than assuming all ducks recorded were actually dabbling ducks.

Table 2. Numbers of geese, dabbling ducks and gulls seen during aerial surveys of the Fraser River estuary, 19 September, 1985.

Location	Geese	Ducks	Gulls
Delta Foreshore ¹	40	5335	244
Boundary Bay Foreshore	0	5160	2545.5
Other Areas	- not surveyed -		

1. Sea Island to Tsawwassen Causeway.

2. Burns Bog dump and surrounding fields; Fraser River from Annacis Island to Steveston.

No geese were seen on the Boundary Bay foreshore in 1985-86, which is consistent with observations from the Boundary Bay study. A few brant were seen in the bay on the 9 January survey but no brant were seen on the foreshore.

Dabbling duck numbers were slightly below those seen previously in Boundary Bay. Because of the timing of the surveys however, the affects of the cold weather in November and December were not observed. Populations presumably would have diminished, as they did in 1983-84, because the uplands were snow and ice covered. By January however, most fields had thawed, and dabbling duck numbers were near normal in Boundary Bay. During the January survey many flooded fields were seen, but the number of ducks in those fields

was very small. Duck hunting season was still open at the time.

Table 3. Numbers of geese, dabbling ducks and gulls seen during aerial surveys of the Fraser River estuary, 30 October, 1985.

Location	Geese	Ducks	Gulls
Delta Foreshore ¹	25378	26027	158
Boundary Bay Foreshore	0	19836	382
Other Areas ²	0	250	45100

1. Sea Island to Tsawwassen Causeway.

2. Burns Bog dump and surrounding fields; Fraser River from Annacis Island to Steveston.

The numbers of gulls on the Boundary Bay foreshore were near normal in September and October but were well above normal in January. Numbers were above average in the Burns Bog and Fraser River areas in both October and January. The total gull population on the delta seems to have been higher than usual in October, for unknown reasons. They were more abundant in January than the average, but they were within the range of previous counts. The ecology and behaviour of gulls on the delta are not as well known as are those of ducks. As a result, the significance of the trend in gull numbers is open to speculation, but over the last four years it appears to have been upwards.

The numbers of birds seen on transect surveys over Boundary Bay are shown in Tables 5 and 6 and compared to previous surveys in Figs. 10 to 12. The results for both survey dates are near the average for Transect 1, and diving ducks are the predominant species group. The numbers seen on Transect 2 were below the average, but close to the ranges, of those seen previously. Diving

Table 4. Numbers of geese, dabbling ducks and gulls seen during aerial surveys of the Fraser River estuary, -9 January, 1986.

Location	Geese	Ducks	Gulls
Delta Foreshore ¹	3200	34662	433
Boundary Bay Foreshore	0	15655	2590
Other Areas ²	0	0	50841

1. Sea Island to Tsawwassen Causeway.

2. Burns Bog dump and surrounding fields; Fraser River from Annacis Island to Steveston.

ducks and gulls were the dominant species group. The first survey on Transect 3 was near the average, but the second survey was above the average. Dabbling ducks were the most abundant species group, and most of those were seen near Beach Grove. The open water near Beach Grove was an important loafing area, while the rest of the transect had relatively low densities of birds.

Table 5. Total number of birds and the relative abundance of each species group seen on transect surveys over Boundary Bay, 30 October 1985.

Transect	Number and relative abundance (%)						
	Total	Brant	Dabbling ducks	Divers	Diving ducks	Gulls	Unid/ others
TR1	3944.0	0.0	1.9	1.2	92.2	4.6	0.0
TR2	228.00	0.0	0.0	7.5	77.2	3.1	12.3
TR3	6007.00	0.0	86.5	0.3	12.0	1.2	0.0

Table 6. Total number of birds and the relative abundance of each species group seen on transect surveys over Boundary Bay, -9 January 1986.

Transect	Number and relative abundance (%)						
	Total	Brant	Dabbling ducks	Divers	Diving ducks	Gulls	Unid/ others
TR1	907.0	0.0	0.0	0.6	96.3	3.9	0.0
TR2	148.0	0.0	4.1	5.4	56.8	29.7	4.1
TR3	10924.00	0.8	98.5	0.1	0.8	0.3	0.2

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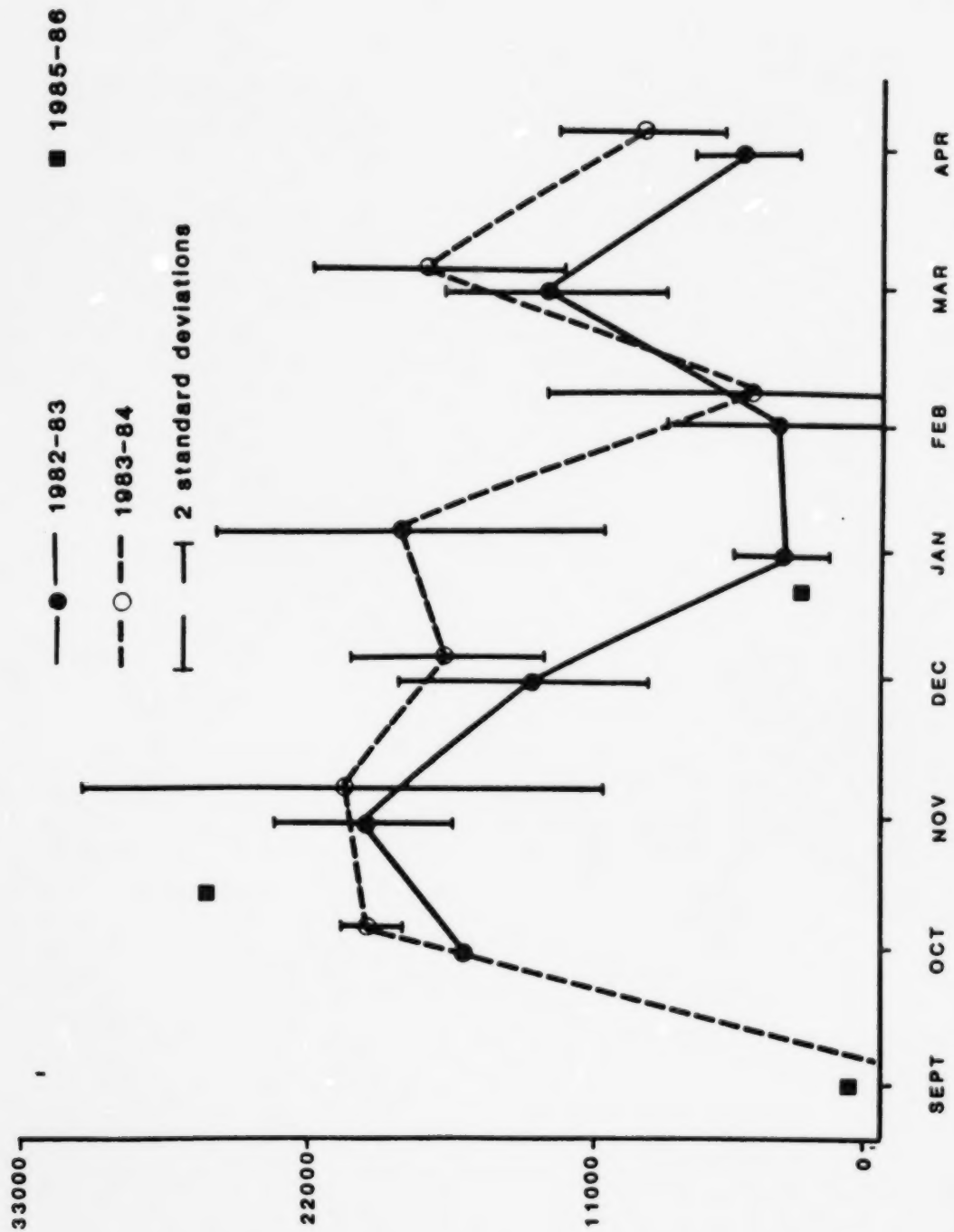


Figure 2. Mean number of geese seen per month on aerial surveys of the Fraser River foreshore winters 1982-83, to 1985-86

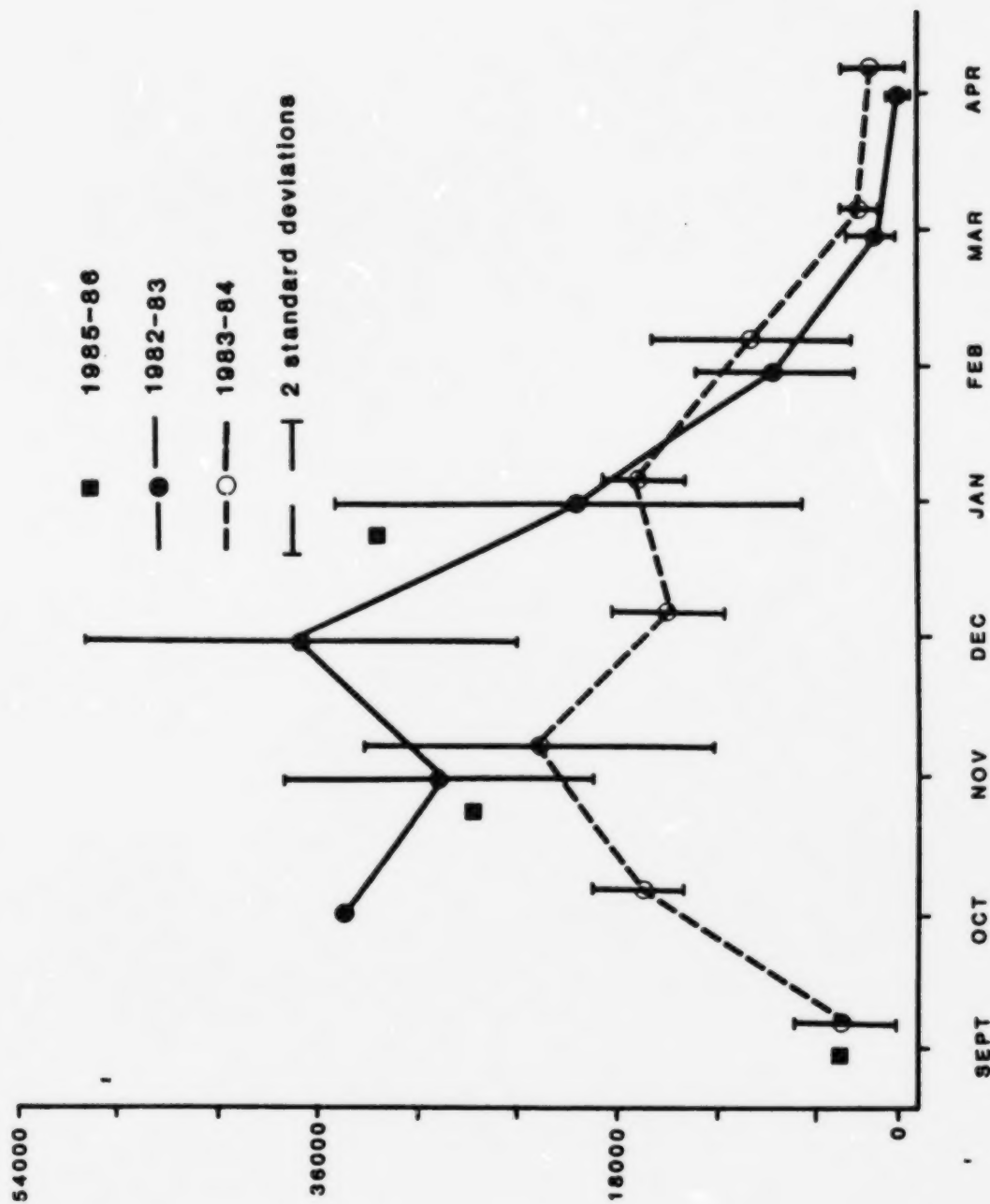


Figure 3. Mean number of dabbling ducks seen per month on aerial surveys of the Fraser River foreshore, winters 1982-83 to 1985-86

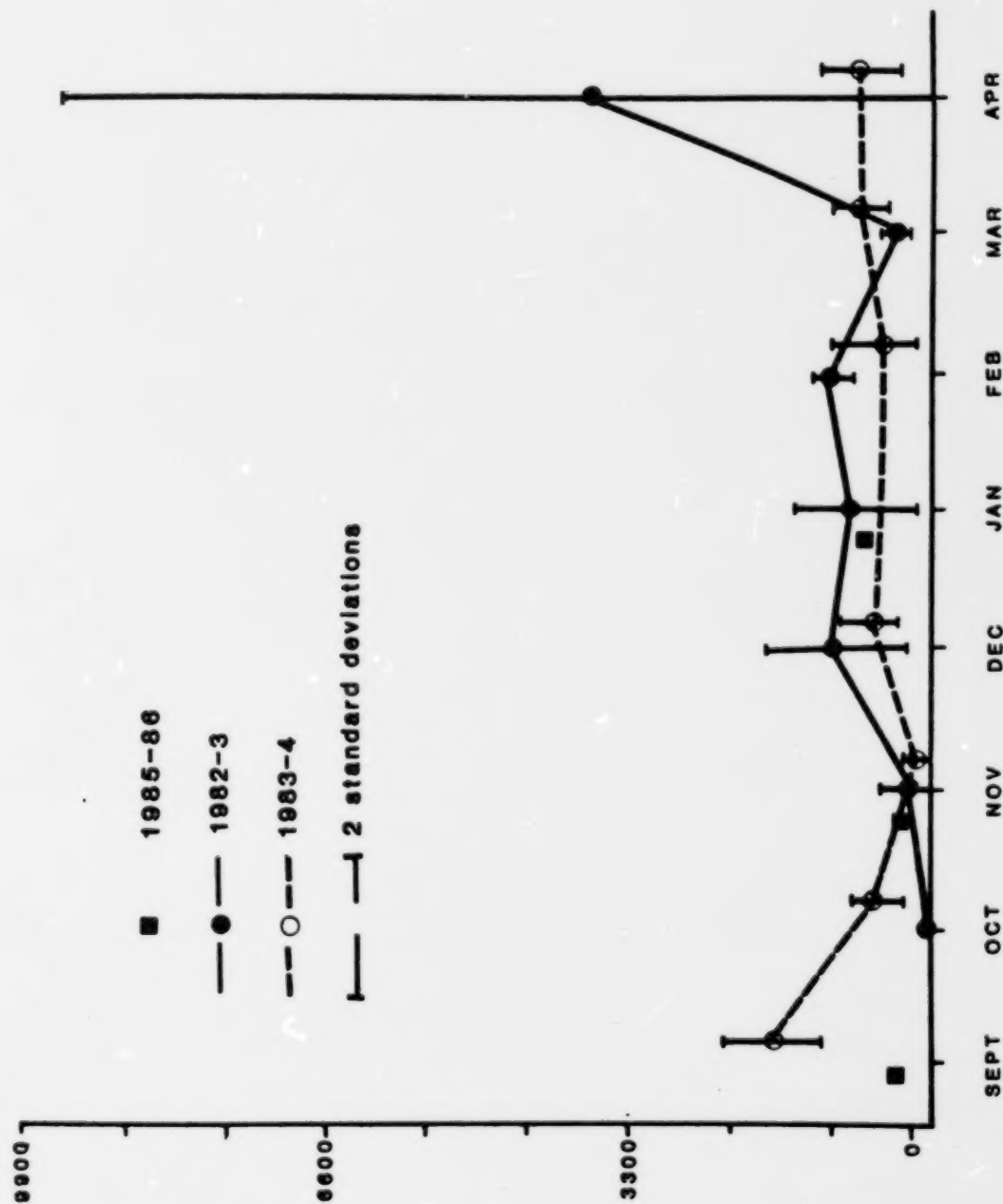


Figure 4. Mean number of gulls seen per month on aerial surveys of the Fraser River foreshore, winters 1982-83 to 1985-86

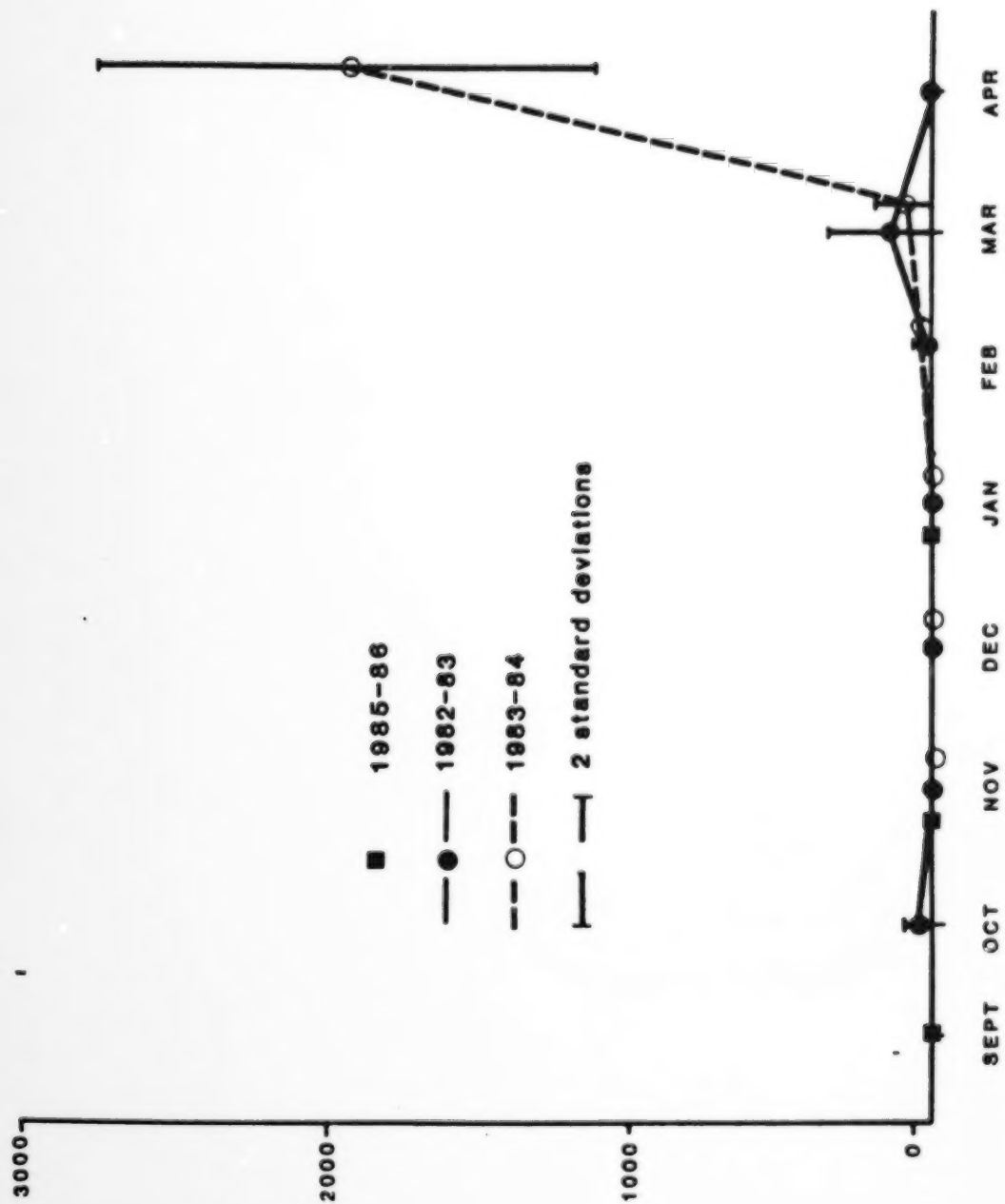


Figure 5. Mean number of geese seen per month on aerial surveys of the Boundary Bay foreshore, winters 1982-83 to 1985-86

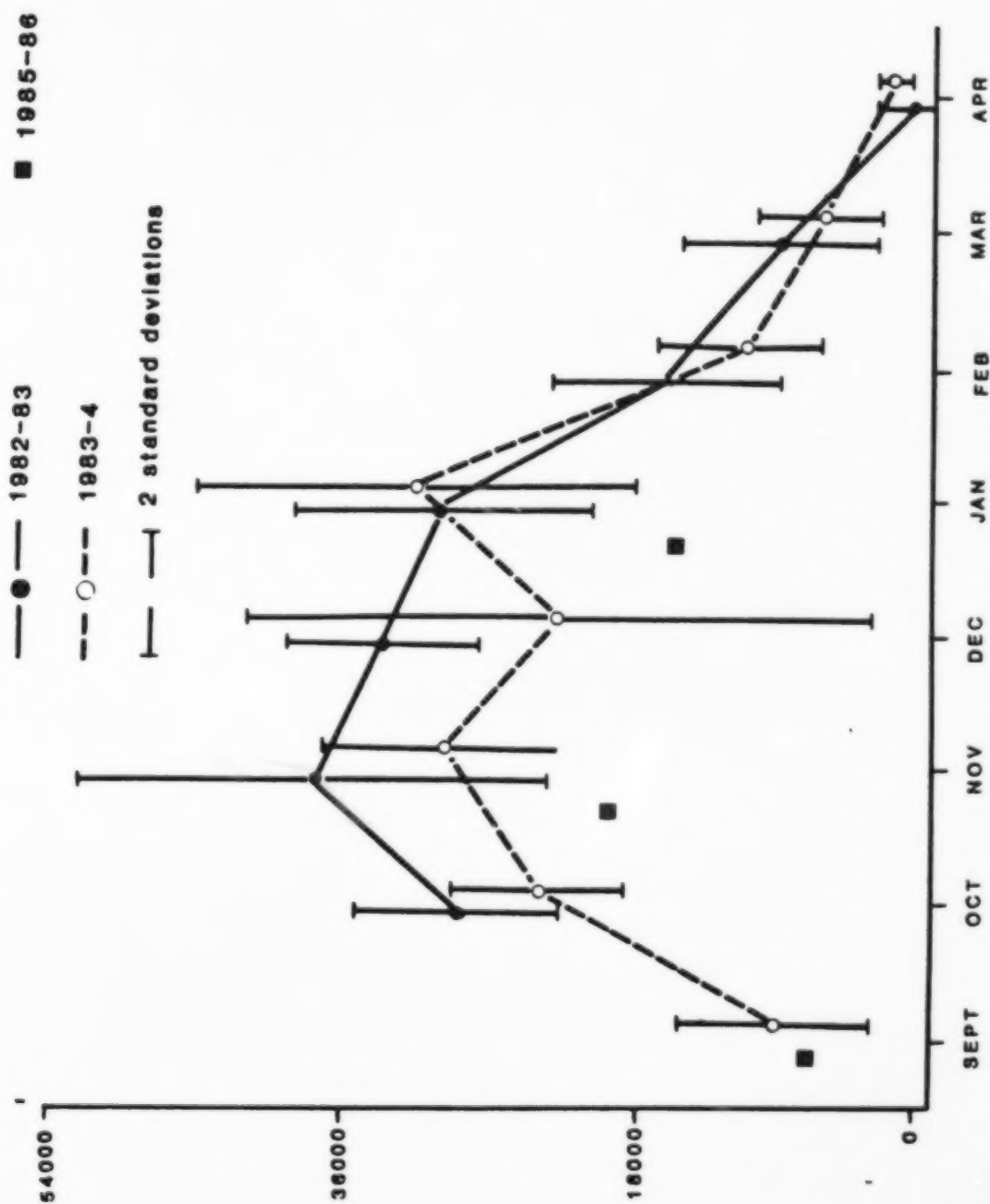


Figure 6. Mean number of dabbling ducks seen per month on aerial surveys of the Boundary Bay foreshore, winters, 1982-83 to 1985-86.

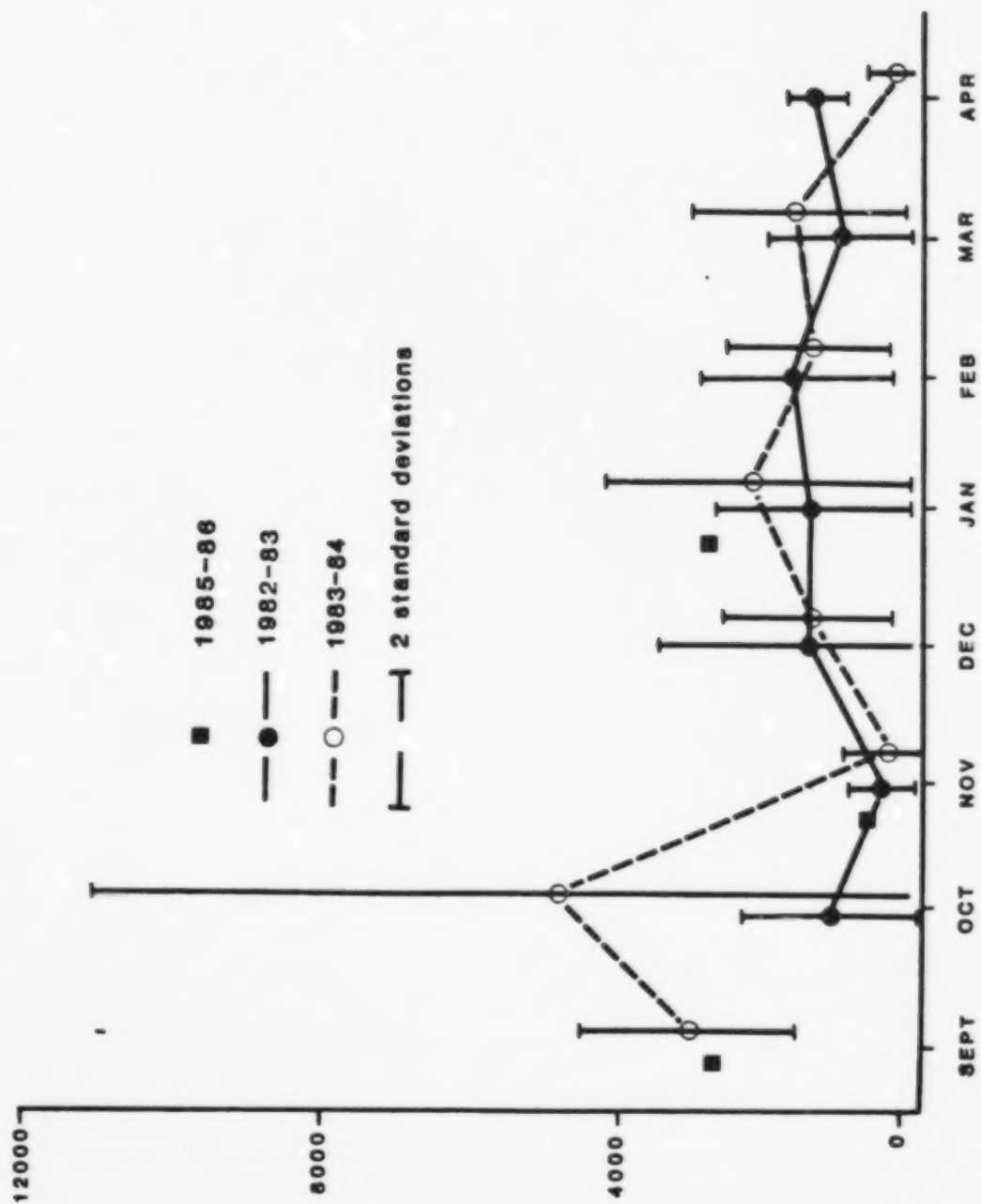


Figure 7. Mean number of gulls seen per month on aerial surveys of the Boundary Bay foreshore, winters 1982-83 to 1985-86.

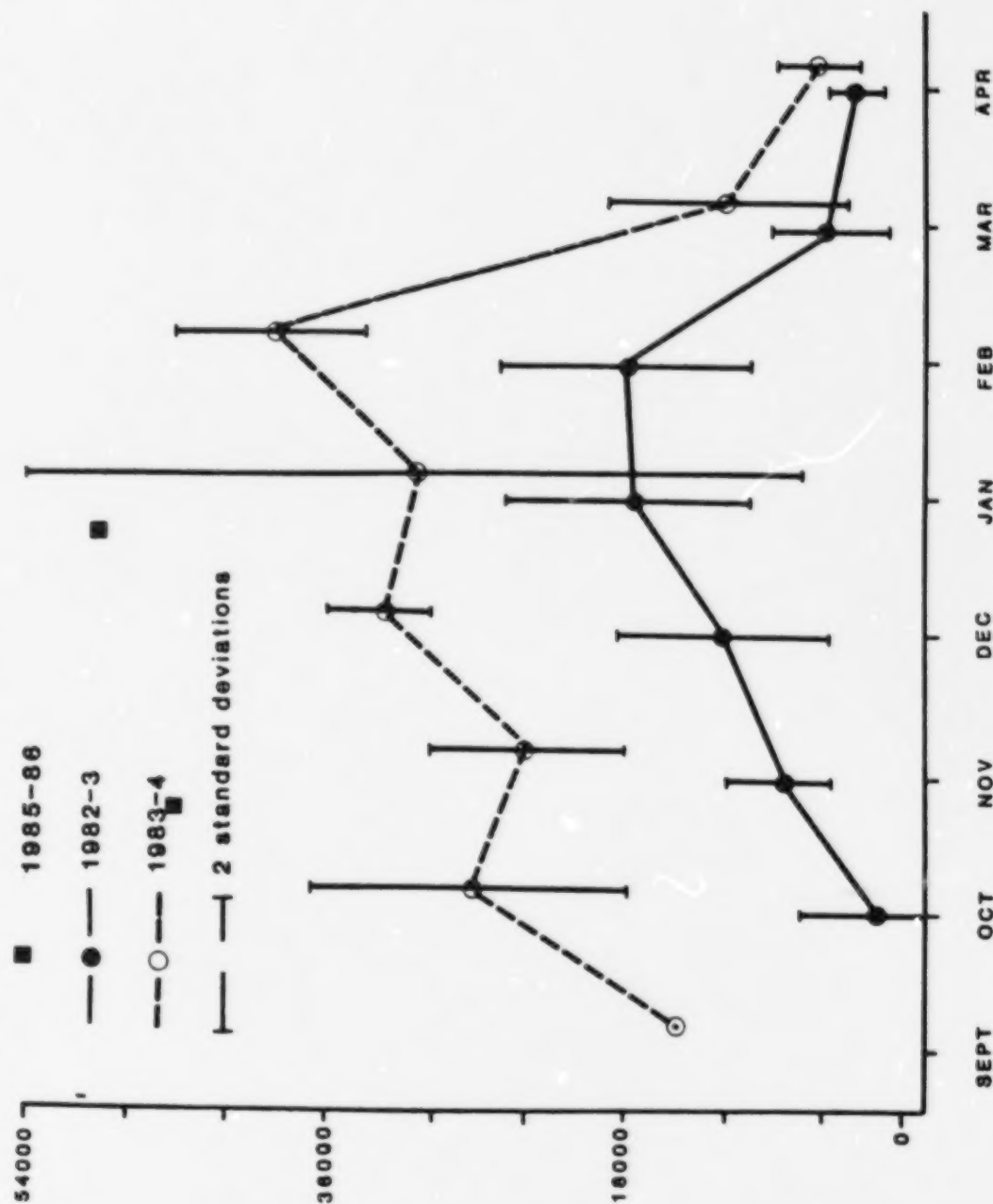


Figure 8. Mean number of gulls seen per month on aerial surveys of the Burns Bog area and the South Arm of the Fraser River, winters 1982-83 to 1985-86.

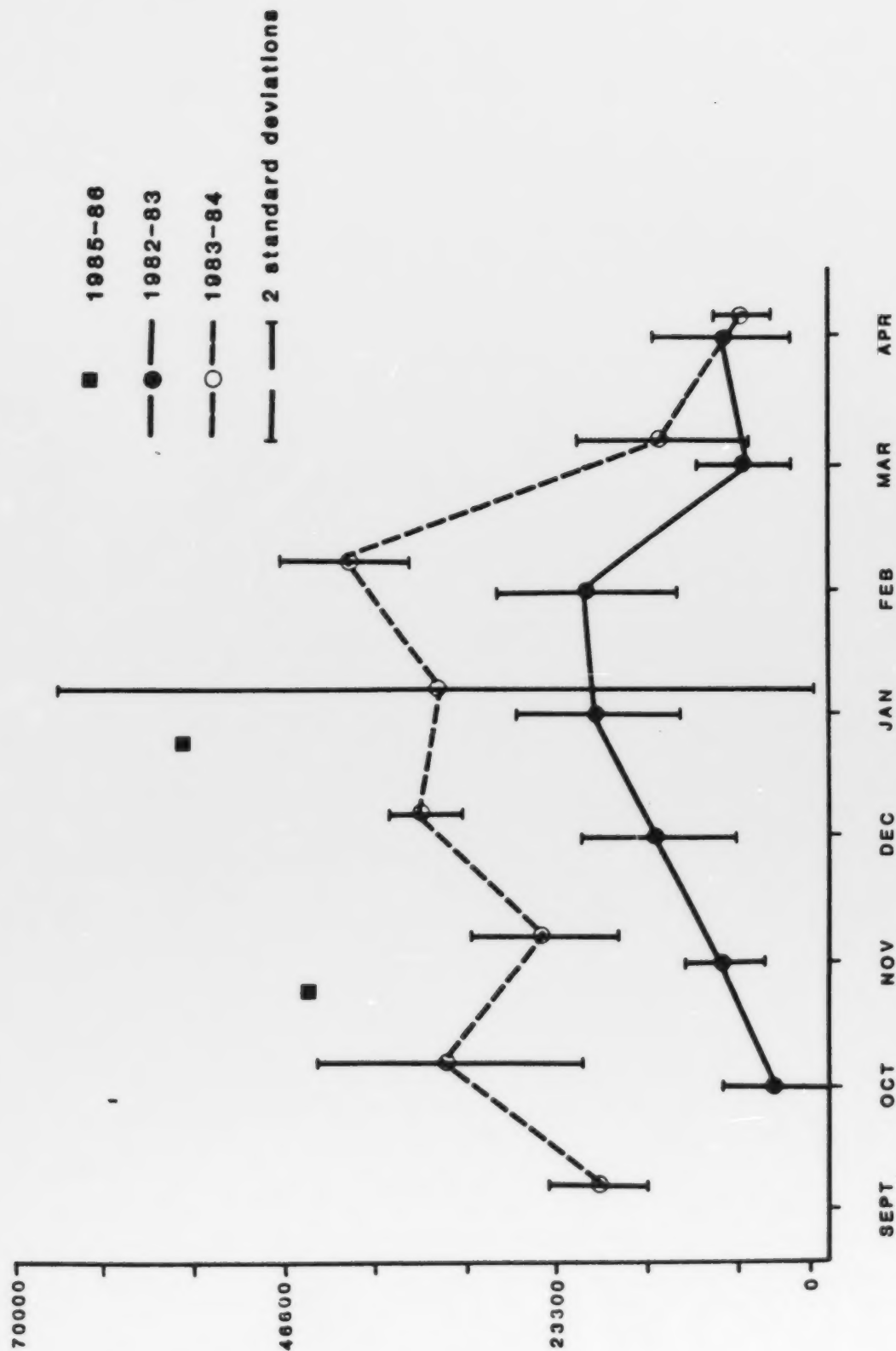


Figure 9. Mean number of gulls seen per month on aerial surveys of the Fraser River delta, winters 1982-83 to 1985-86.

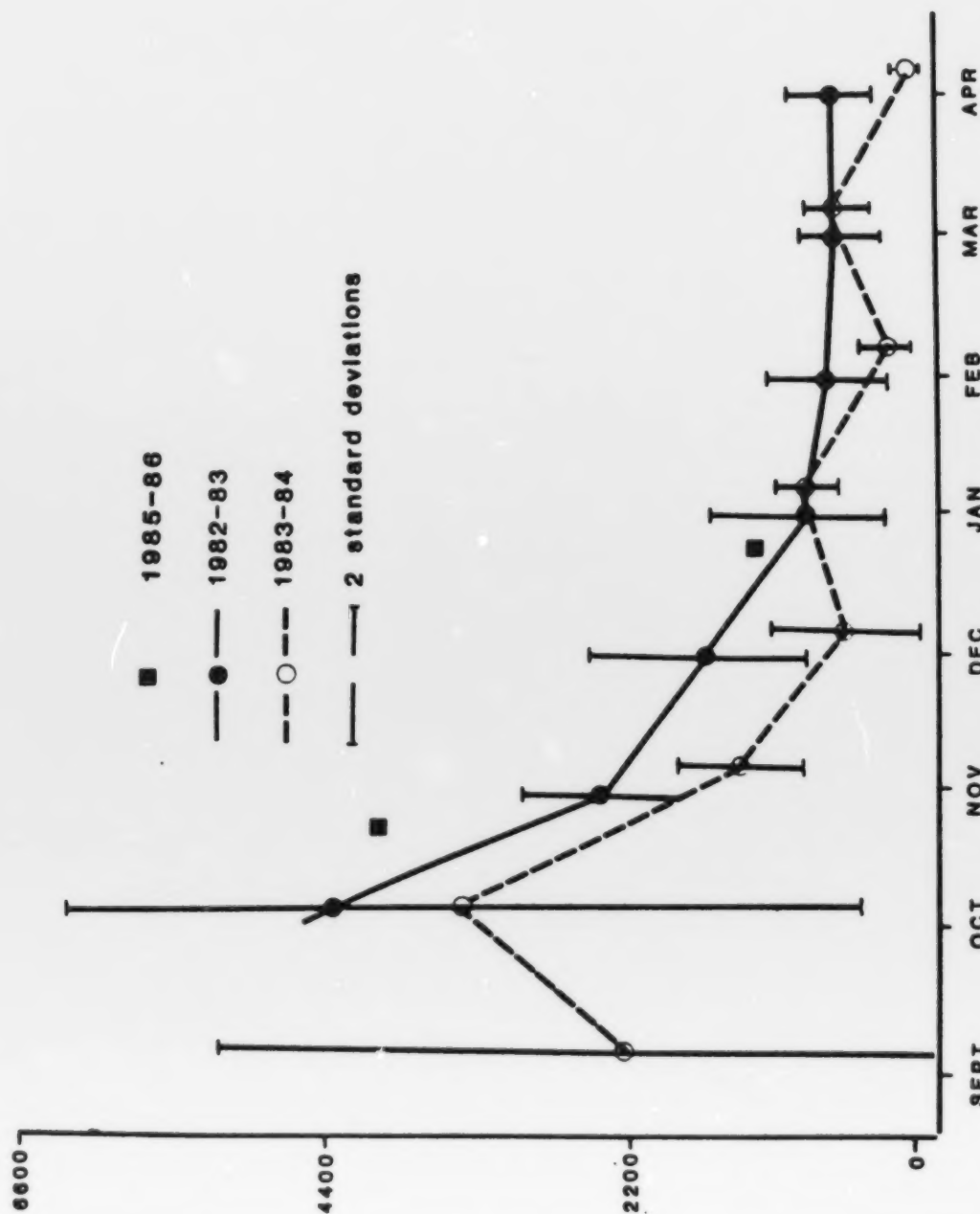


Figure 10. Mean number of total birds seen per month on aerial surveys on Transect 1, Boundary Bay, winters 1982-83 to 1985-86.

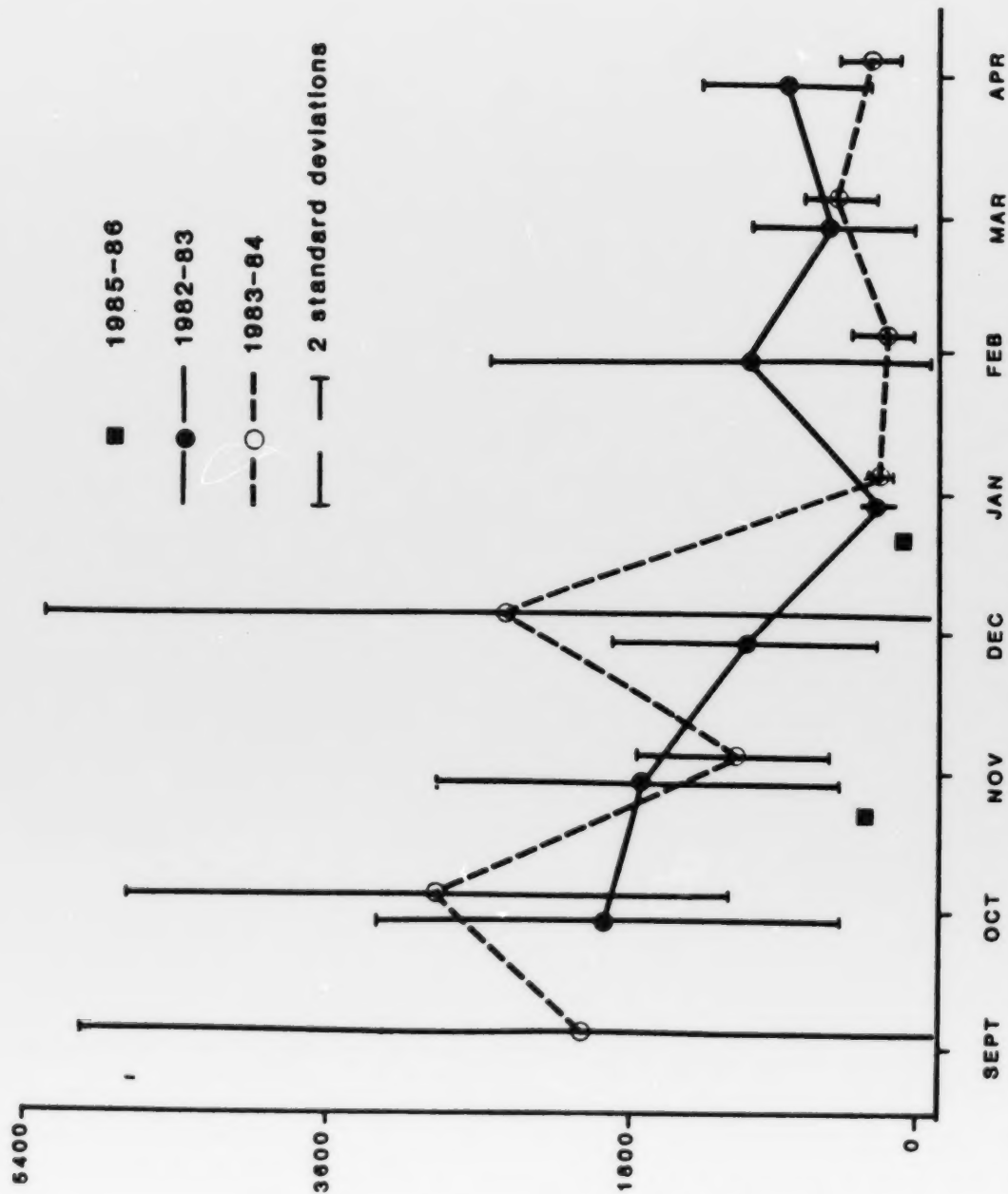


Figure 11. Mean number of total birds seen per month on aerial surveys on Transect 2, Boundary Bay, winters 1982-83 to 1985-86.

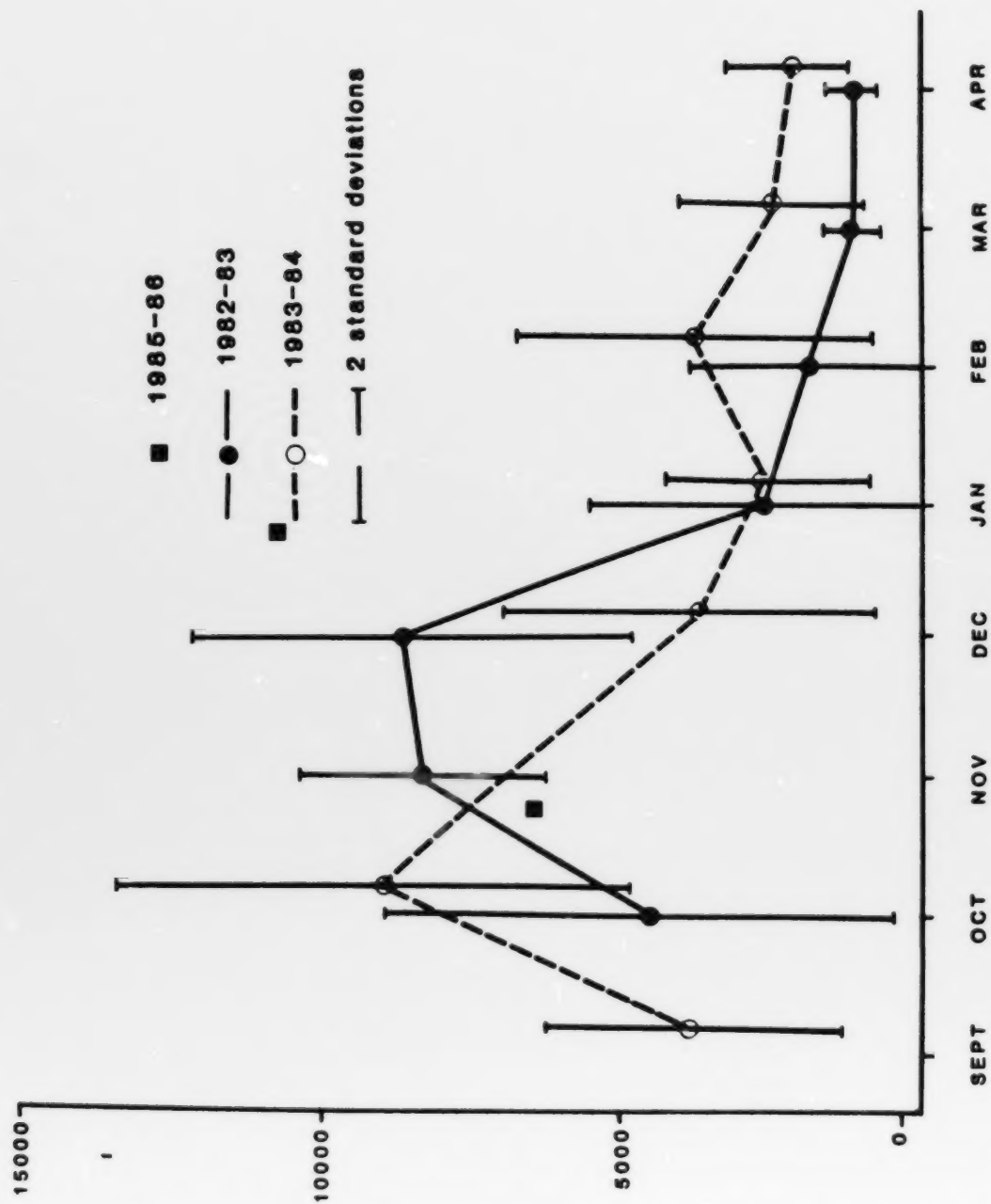


Figure 12. Mean number of total birds seen per month on aerial surveys on Transect 3, Boundary Bay, winters 1982-83 to 1985-86.

APPENDIX 1.

Summaries of numbers of birds seen, by species
groups, on each transect, for each survey.

Table 1-1. Number of birds, by species groups, seen 19 September on aerial surveys of the Fraser River Delta, 1985.

Transect	Divers	Herons	Swans	Snow Geese	Canada Geese	Brant	Dabbling Ducks	Diving Ducks	Shore- Birds	Gulls	Others/ Unid
RIV	2	2	-	-	-	-	8	-	-	8	1
LUL	-	2	-	-	-	-	216	-	-	40	-
WES	2	2	-	-	40	-	1130	2	-	30	-
BRU	-	5	-	-	-	-	2510	7	-	55	-
RBC	81	2	-	-	-	-	703	25	-	76	1
TR1	-	-	-	-	-	-	-	-	-	-	-
TR2	-	-	-	-	-	-	-	-	-	-	-
TR3	-	-	-	-	-	-	-	-	-	-	-
MUD	-	6	-	-	-	-	1755	-	-	868	-
112	-	16	-	-	-	-	1345	-	-	191	-
104	-	1	-	-	-	-	172	-	-	152	-
096	-	3	-	-	-	-	187	-	-	752	-
088	-	1	-	-	-	-	105	-	-	354	-
080	1	-	-	-	-	-	375	-	-	93	-
072	-	-	-	-	-	-	270	-	-	76	-
064	-	1	-	-	-	-	950	-	-	57	-
FD1	-	-	-	-	-	-	-	-	-	-	-
BOG	-	-	-	-	-	-	-	-	-	-	-
FD2	-	-	-	-	-	-	-	-	-	-	-
ANN	-	-	-	-	-	-	-	-	-	-	-
TIL	-	-	-	-	-	-	-	-	-	-	-
DEA	-	-	-	-	-	-	-	-	-	-	-
SEA	12	-	-	-	-	-	768	2	-	35	-

Table 1-2. Number of birds, by species groups, seen 30 October on aerial surveys of the Fraser River Delta, 1985.

Transect	Divers	Hérons	Swans	Snow Geese	Canada Geese	Brant	Dabbling Ducks	Diving Ducks	Shore- Birds	Gulls	Others/ Unid
RIV	-	-	-	-	-	-	647	-	-	-	-
LUL	-	-	12	13600	-	-	158	-	-	6	-
WES	-	1	4	22700	-	-	3627	-	-	25	-
BRU	-	1	-	-	10	-	1815	-	700	15	-
RBC	-	-	-	-	-	-	18150	-	350	12	-
TR1	48	-	-	-	-	-	75	3637	-	183	1
TR2	17	-	-	-	-	-	-	176	-	7	28
TR3	16	-	-	-	-	-	5197	719	-	75	-
MUD	-	5	-	-	-	-	1656	-	3000	13	-
112	-	-	-	-	-	-	800	-	1425	31	1
104	-	-	-	-	-	-	4662	-	1400	-	3
096	-	-	-	-	-	-	1337	-	12475	100	-
088	-	-	-	-	-	-	1880	-	1320	3	-
080	-	-	-	-	-	-	1350	-	7550	145	-
072	-	-	-	-	-	-	8125	-	5375	12	-
064	-	-	-	-	-	-	25	-	8500	77	-
FD1	-	-	-	-	-	-	250	-	-	-	-
BOG	-	-	-	-	-	-	-	-	-	5523	-
FD2	-	-	-	-	-	-	-	-	-	4900	-
ANN	-	-	-	-	-	-	-	-	-	11452	-
TIL	-	-	-	-	-	-	-	-	-	23210	-
DFA	-	-	-	-	-	-	-	-	-	15	-
SEA	-	-	-	1550	-	-	1630	-	-	100	-

Table 1-3. Number of birds, by species groups, seen -9 January on aerial surveys of the Fraser River Delta, 1986.

Transect	Divers	Hérons	Swans	Snow Geese	Canada Geese	Brant	Dabbling Ducks	Diving Ducks	Shore- Birds	Gulls	Others/ Unid
RIV	-	-	-	-	-	-	-	-	-	-	-
LUL	-	-	45	-	-	-	420	-	-	9	-
WES	1	-	102	3200	-	-	41	1	-	203	-
BRU	-	-	69	-	-	-	3500	-	9025	99	-
RBC	-	-	-	-	-	-	30000	-	-	106	-
TR1	6	-	-	-	-	-	-	873	-	28	-
TR2	8	-	-	-	-	-	6	84	-	44	6
TR3	6	-	-	-	-	19	10760	85	-	30	24
MUD	-	3	-	-	-	-	975	-	-	997	-
112	-	-	-	-	-	-	175	-	4250	156	-
104	-	-	-	-	-	-	937	-	1250	48	-
096	-	-	-	-	-	-	3825	-	-	539	1
088	-	-	-	-	-	-	1575	175	-	521	-
080	-	-	-	-	-	-	1567	-	-	271	-
072	-	-	-	-	-	-	1600	-	-	57	-
064	-	-	-	-	-	-	5000	-	-	-	-
FD1	-	-	-	-	-	-	-	-	-	1500	-
BOG	-	-	-	-	-	-	-	-	-	16003	-
FD2	-	-	-	-	-	-	-	-	-	307	-
ANN	-	-	-	-	-	-	-	-	-	3711	-
TIL	-	-	-	-	-	-	-	-	-	28300	-
DEA	-	-	-	-	-	-	-	-	-	1020	-
SEA	4	-	-	-	-	-	701	22	-	16	-